

RM0 TO RM1 SEDIMENT PROGRAM NARRATIVE

As a supplement to the 2004-2006 USEPA Remedial Investigation (RI) sampling program, Malcolm Pirnie, Inc. collected additional sediment samples from river mile (RM) 0 to RM1 of the Lower Passaic River between June 9 and June 10, 2008.¹ This supplemental program included the collection of surface sediment samples (representing 0-1 inch and 0-6 inch depth) to support the refinement of the conceptual site model (CSM) for the Lower Passaic River Restoration Project. The following narrative summarizes the collected sediment samples and requested analyses. Data for this program are available in the project database under survey identification number 20001.

Field work was conducted in accordance with the Lower Passaic River Restoration Project Work Plan (Malcolm Pirnie, Inc., January 2006) and the Lower Passaic River Restoration Project Quality Assurance Project Plan (QAPP; Malcolm Pirnie, Inc., August 2005) and its accompanying addendum (dated December 17, 2007 and further revised on June 5, 2008). Methods describing surface sediment samples collection are described in Standard Operating Procedure (SOP) 24 “Collecting Surface Sediments Using an Ekman or Ponar Dredge” of the QAPP/Field Sampling Plan (FSP) Addendum (Attachment 15).

SUMMARY OF RM0 TO RM1 SEDIMENT PROGRAM

To meet the data needs and objectives described in FSP Volume 1 and the QAPP/FSP Addendum, the following steps were implemented to conduct the RM0 to RM1 Sediment Program:

- Identify sampling locations in the navigational channel and the Kearny Point mudflats to address the data needs for surface sediment samples between RM0 and RM1.
- Collect surface sediment samples at 18 locations using an Ekman dredge. Each location includes two co-located samples (0-1 inch sample and 0-6 inch sample).
- Ship all samples for laboratory analyses; based on funding, prioritize sample analyses.
- No archive material remains.

DETAILS OF THE SAMPLING PROGRAM

Surface sediment samples were collected from 18 locations in the navigation channel and Kearny Point mudflats of the Lower Passaic River between RM0 to RM1 (Figure 1). Sampling locations in the channel were arranged in three transects [designated as channel transect #1 (T1), channel transect #2 (T2), and channel transect #3 (T3)]. Transects were positioned at the boundary of the Lower Passaic River Study Area at RM0 and extended to RM0.6.² Along each transect, three sampling locations were identified to characterize the western slope of the channel, the center channel, and the eastern slope of the channel (total of 9 locations). The remaining sampling locations were distributed on the mudflats with 4 locations positioned along the Study Area boundary at RM0 [total of 9 locations; mudflat (MF) 1 through MF9].

¹ As part of this supplemental 2007-2008 field work, water column samples and sediment samples were also collected. These programs are described in separate narratives: “2008-11-05 Supplemental Sediment Program” and “2008-11-05 Rain Event Sampling Program.”

² A surface sediment sample (LPRP-SCSH-PSR-001600) was collected at RM1 on December 11, 2007.

Actual sampling locations deviate from the locations proposed in the QAPP/FSP Addendum (dated June 5, 2008) due to leaf debris, which interfered with sampling collection. The proposed T2 transect was planned to be in-line with the MF5 and MF6 locations. However, in the field, the T2C and T2E locations had significant leaf debris that interfered with accurate collection of the 0-1 inch samples. Consequently, all of the T2 samples, including those samples collected at T2W, were discarded, and the entire T2 transect was moved downriver. The new T2 transect was positioned in-line with the MF7 and MF8 locations. This field deviation resulted in 21 locations being actually sampled, but samples from only 18 locations were processed and shipped to the laboratories. Table 1 provides field notes and descriptions for the 18 sampling locations.

Table 1: Field Notes on Channel and Mudflat Sampling Locations

Location	Description	Water Depth (feet)	Field Notes
T1W	Channel (west)	20 feet	Dark grey-to-black silt with trace sand and little organic debris
T1C	Channel (central)	18 feet	Dark grey-to-black silt with trace sand and organic matter
T1E	Channel (east)	6 feet	Dark grey-to-black silt with some sand
T2W	Channel (west)	25 feet	Dark grey-to-black silt with trace fine sand
T2C	Channel (central)	28 feet	Dark grey-to-black silt with trace fine sand
T2E	Channel (east)	12 feet	Dark brown silt with some sand
T3W	Channel (west)	23 feet	Dark brown silt with trace sand
T3C	Channel (central)	27 feet	Dark brown silt with trace sand
T3E	Channel (east)	7 feet	Sand with some silt, lots of shells
MF1	Mudflat	7 feet	Dark brown silt with trace sand
MF2	Mudflat	5 feet	Dark brown silt with trace sand
MF3	Mudflat	7 feet	Dark brown silt with trace sand
MF4	Mudflat	3 feet	Dark brown silt with trace sand
MF5	Mudflat	2.5 feet	Dark grey-to-black silt with trace sand
MF6	Mudflat	4 feet	Dark brown silt with some sand and shells
MF7	Mudflat	4 feet	Dark brown silt with some sand
MF8	Mudflat	3 feet	Dark brown silt with trace sand
MF9	Mudflat	3 feet	Dark brown silt with some sand

At each location, samples were collected from 0-1 inch depth and 0-6 inch depth using an Ekman dredge. A boat was anchored at each location, and the depth of the water was measured (Table 1). The Ekman dredge equipped with a polycarbonate liner and extension rods was advanced to the sediment surface, where the dredge was pushed into the sediments. The dredge was then tripped, closing the jaws of the dredge. Once retrieved, the water in the dredge was decanted off the top, and the dredge was placed vertically into an aluminum lined receiving pan. Two field personnel then opened the dredge and pushed it firmly flat onto the bottom of the receiving pan. The polycarbonate liner was then released from within the dredge, leaving only the liner with the sediment intact in the receiving pan. A decontaminated stainless steel spatula was then used to scoop the top 1-inch of sediment into a decontaminated stainless steel bowl. Sediments were homogenized in the bowl using American Society for Testing and Materials (ASTM) mixing protocols. The sample was then scooped into the appropriate sample

jars for shipment to the laboratories. This procedure was repeated once more at the same location for the collection of the 0-6 inch depth sample.

Table 2 provides information for querying samples in the project database. Duplicate samples are listed in Table 3. Additional notes are provided in the “Comments” field of the *dbo_Samples* table in the project database.

Table 2: RM0 to RM1 Samples Collected on the Lower Passaic River

Field Name	Sample Date	Sample Identification in Database	Core Identification in Database	Location Identification in Database
T1W 0-1	6/10/2008	LPRP-SCSH-PSR-001676	5262	G0000174
T1W 0-6	6/10/2008	LPRP-SCSH-PSR-001677	5263	G0000174
T1C 0-1	6/10/2008	LPRP-SCSH-PSR-001678	5264	G0000175
T1C 0-6	6/10/2008	LPRP-SCSH-PSR-001679	5265	G0000175
T1E 0-1	6/10/2008	LPRP-SCSH-PSR-001680	5266	G0000176
T1E 0-6	6/10/2008	LPRP-SCSH-PSR-001681	5267	G0000176
T2W 0-1	6/9/2008	LPRP-SCSH-PSR-001682	5268	G0000177
T2W 0-6	6/9/2008	LPRP-SCSH-PSR-001683	5269	G0000177
T2C 0-1	6/9/2008	LPRP-SCSH-PSR-001684	5270	G0000178
T2C 0-6	6/9/2008	LPRP-SCSH-PSR-001685	5271	G0000178
T2E 0-1	6/9/2008	LPRP-SCSH-PSR-001686	5272	G0000179
T2E 0-6	6/9/2008	LPRP-SCSH-PSR-001687	5273	G0000179
T3W 0-1	6/9/2008	LPRP-SCSH-PSR-001688	5274	G0000180
T3W 0-6	6/9/2008	LPRP-SCSH-PSR-001690	5275	G0000180
T3C 0-1	6/9/2008	LPRP-SCSH-PSR-001692	5276	G0000181
T3C 0-6	6/9/2008	LPRP-SCSH-PSR-001693	5277	G0000181
T3E 0-1	6/9/2008	LPRP-SCSH-PSR-001694	5278	G0000182
T3E 0-6	6/9/2008	LPRP-SCSH-PSR-001695	5279	G0000182
MF1 0-1	6/9/2008	LPRP-SCSH-PSR-001696	5280	G0000183
MF1 0-6	6/9/2008	LPRP-SCSH-PSR-001697	5281	G0000183
MF2 0-1	6/9/2008	LPRP-SCSH-PSR-001698	5282	G0000184
MF2 0-6	6/9/2008	LPRP-SCSH-PSR-001699	5283	G0000184
MF3 0-1	6/9/2008	LPRP-SCSH-PSR-001700	5284	G0000185
MF3 0-6	6/9/2008	LPRP-SCSH-PSR-001702	5285	G0000185
MF4 0-1	6/10/2008	LPRP-SCSH-PSR-001704	5286	G0000186
MF4 0-6	6/10/2008	LPRP-SCSH-PSR-001705	5287	G0000186
MF5 0-1	6/10/2008	LPRP-SCSH-PSR-001706	5288	G0000187
MF5 0-6	6/10/2008	LPRP-SCSH-PSR-001707	5289	G0000187
MF6 0-1	6/10/2008	LPRP-SCSH-PSR-001708	5290	G0000188
MF6 0-6	6/10/2008	LPRP-SCSH-PSR-001709	5291	G0000188
MF7 0-1	6/10/2008	LPRP-SCSH-PSR-001710	5292	G0000189
MF7 0-6	6/10/2008	LPRP-SCSH-PSR-001711	5293	G0000189
MF8 0-1	6/10/2008	LPRP-SCSH-PSR-001712	5294	G0000190
MF8 0-6	6/10/2008	LPRP-SCSH-PSR-001713	5295	G0000190
MF9 0-1	6/10/2008	LPRP-SCSH-PSR-001714	5296	G0000191
MF9 0-6	6/10/2008	LPRP-SCSH-PSR-001715	5297	G0000191

Table 3: Duplicate Samples

Field Core Name	Parent	Duplicate
T3W 0-1 Dup	LPRP-SCSH-PSR-001688	LPRP-SCSH-PSR-001689 *
T3W 0-6 Dup	LPRP-SCSH-PSR-001690	LPRP-SCSH-PSR-001691
MF3 0-1 Dup	LPRP-SCSH-PSR-001700	LPRP-SCSH-PSR-001701
MF3 0-6 Dup	LPRP-SCSH-PSR-001702	LPRP-SCSH-PSR-001703

* The duplicate LPRP-SCSH-PSR-001689 was not analyzed for all parameters.

DETAILS ON LABORATORY ANALYSIS

Navigation Channel Samples:

All the 0-1 inch and 0-6 inch samples collected in the channel, except for sample LPRP-SCSH-PSR-001677 and LPRP-SCSH-PSR-001689, were analyzed by Accutest Laboratories (Dayton, New Jersey) for total organic carbon (TOC) and target analyte list (TAL) metals including titanium and mercury and by GeoSea Consulting (British Columbia, Canada) for grain size. The 0-1 inch samples, except for sample LPRP-SCSH-PSR-001677, were also analyzed by Outreach Laboratories (Broken Arrow, Oklahoma) for radiological parameters, including beryllium-7 (Be-7), cesium-137 (Cs-137) and potassium-40 (K-40). All the 0-1 inch samples were shipped to the laboratory and archived (frozen at -10 degrees Celsius) by the laboratory according to specifications listed in the QAPP/FSP Addendum.

Based on the highest detected Be-7 levels and the greatest longitudinal separation in the channel, two 0-1 inch samples (LPRP-SCSH-PSR-001678 and LPRP-SCSH-PSR-001692) were selected to be further analyzed for organic analyses, which included polychlorodibenzodioxins/furans (PCDD/F), polychlorinated biphenyl (PCB) congeners, polycyclic aromatic hydrocarbons (PAH) compounds, and organic chlorinated pesticides. The following six predetermined co-located 0-6 inch samples were also submitted for organics analyses: LPRP-SCSH-PSR-001683, LPRP-SCSH-PSR-001685, LPRP-SCSH-PSR-001687, LPRP-SCSH-PSR-001690, LPRP-SCSH-PSR-001691 (which is the duplicate of LPRP-SCSH-PSR-001690), and LPRP-SCSH-PSR-001695. Refer to the QAPP/FSP Addendum SOP – Attachment 1: Worksheet 18 for more detail.

Kearny Point Mudflat Samples:

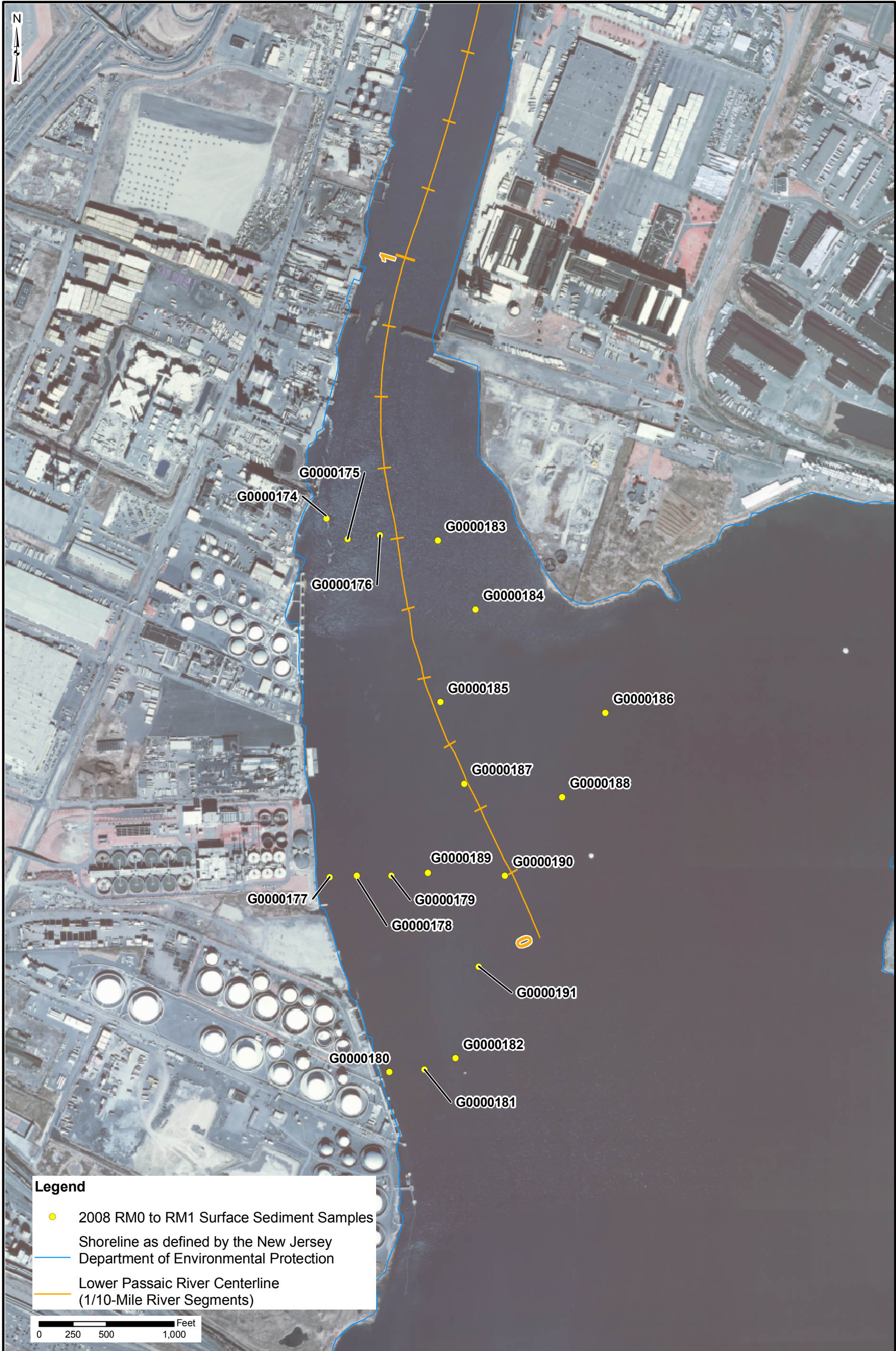
All of the ten 0-1 inch samples collected in the mudflats were analyzed for radiological parameters (Be-7, Cs-137, and K-40). The co-located 0-6 inch samples were all analyzed for TOC, TAL metals including titanium and mercury, and grain size distribution. The following five predetermined co-located 0-6 inch samples were also submitted for organics analyses (PCDD/F, PCB, PAH, and pesticides): LPRP-SCSH-PSR-001697, LPRP-SCSH-PSR-001702, LPRP-SCSH-PSR-001707, LPRP-SCSH-PSR-001709 and LPRP-SCSH-PSR-001715. Refer to the QAPP/FSP Addendum SOP – Attachment 1: Worksheet 18 for more detail.

Table 4 provides analyses information for all the samples collected as part of the RM0 to RM1 Sediment Sampling Program. Data corresponding to the analyses marked in Table 4 are available in the project database. Note that at the time that this narrative was written, the grain size data were not available on the project database. However, the data

package (as received) from GeoSea Consulting is available in the project database download as a separate zip-file.

Table 4: Laboratory Analysis for RM0 to RM1 Samples

Sample Identification in Database	Radiological Parameters (Cs-137, Be-7, K-40)	PCDD/F	PCB congeners	Pesticide	PAH	TOC	Metals (plus mercury and Titanium)	Grain Size
LPRP-SCSH-PSR-001676	✓					✓	✓	✓
LPRP-SCSH-PSR-001677								✓
LPRP-SCSH-PSR-001678	✓	✓	✓	✓	✓	✓	✓	✓
LPRP-SCSH-PSR-001679						✓	✓	✓
LPRP-SCSH-PSR-001680	✓					✓	✓	✓
LPRP-SCSH-PSR-001681						✓	✓	✓
LPRP-SCSH-PSR-001682	✓					✓	✓	✓
LPRP-SCSH-PSR-001683		✓	✓	✓	✓	✓	✓	✓
LPRP-SCSH-PSR-001684	✓					✓	✓	✓
LPRP-SCSH-PSR-001685		✓	✓	✓	✓	✓	✓	✓
LPRP-SCSH-PSR-001686	✓					✓	✓	✓
LPRP-SCSH-PSR-001687		✓	✓	✓	✓	✓	✓	✓
LPRP-SCSH-PSR-001688	✓					✓	✓	✓
LPRP-SCSH-PSR-001689	✓							
LPRP-SCSH-PSR-001690		✓	✓	✓	✓	✓	✓	✓
LPRP-SCSH-PSR-001691		✓	✓	✓	✓	✓	✓	✓
LPRP-SCSH-PSR-001692	✓	✓	✓	✓	✓	✓	✓	✓
LPRP-SCSH-PSR-001693		✓	✓	✓	✓	✓	✓	✓
LPRP-SCSH-PSR-001694	✓					✓	✓	✓
LPRP-SCSH-PSR-001695						✓	✓	✓
LPRP-SCSH-PSR-001696	✓							
LPRP-SCSH-PSR-001697		✓	✓	✓	✓	✓	✓	✓
LPRP-SCSH-PSR-001698	✓							
LPRP-SCSH-PSR-001699						✓	✓	✓
LPRP-SCSH-PSR-001700	✓							
LPRP-SCSH-PSR-001701	✓							
LPRP-SCSH-PSR-001702		✓	✓	✓	✓	✓	✓	✓
LPRP-SCSH-PSR-001703						✓	✓	✓
LPRP-SCSH-PSR-001704	✓							
LPRP-SCSH-PSR-001705						✓	✓	✓
LPRP-SCSH-PSR-001706	✓							
LPRP-SCSH-PSR-001707		✓	✓	✓	✓	✓	✓	✓
LPRP-SCSH-PSR-001708	✓							
LPRP-SCSH-PSR-001709		✓	✓	✓	✓	✓	✓	✓
LPRP-SCSH-PSR-001710	✓							
LPRP-SCSH-PSR-001711						✓	✓	✓
LPRP-SCSH-PSR-001712	✓							
LPRP-SCSH-PSR-001713						✓	✓	✓
LPRP-SCSH-PSR-001714	✓							
LPRP-SCSH-PSR-001715		✓	✓	✓	✓	✓	✓	✓



Surface Sediment Sampling from River Mile (RM) 0 to RM 1
Lower Passaic River Restoration Project

Figure 1
November 2008

